

REMARKS

Claims 1-19 are pending in this application. By this Amendment, claim 1 is amended.

Specifically, claim 1 is amended to recite an average carbon number N_c not less than 29 but not more than 35, a viscosity index of 145-170 and a kinematic viscosity at 40°C of 17-25 mm²/s. Support for the amendment may be found at least at paragraphs [0046] and [0047].

No new matter is added.

Rejections Under 35 U.S.C. §112, Second Paragraph

Claim 1, and dependent claims, are rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite. Specifically, the Patent Office alleges that the phrase "one molecule is not more than $(0.2N_c-3.1)$ but not less than 1.5" is indefinite.

Claim 1 has been amended to add a comma after the word molecule in the quoted phrase. Applicants submit that the meaning of the phrase is clear. The range "not more than $(0.2N_c-3.1)$ but not less than 1.5" defines the average branch number, N_b . The value is calculated based on the ratio of CH₃ carbon to total carbon determined by ¹³C-NMR analysis and the average carbon number in one molecule. The formula $(0.2N_c-3.1)$ defines the upper endpoint of the range, and 1.5 defines the lower endpoint of the range. For example, where N_c is 29, the range for N_b would be $1.5 \leq N_b \leq ((0.2)(29.0)-3.1)$, or $1.5 \leq N_b \leq 2.7$. In addition, the method of calculating the average branch number N_b is described in detail at paragraph [0051] of the specification. Applicants submit that claim 1 is thus definite.

Applicants request withdrawal of the rejection.

Claim 4 is rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite. Specifically, the Patent Office alleges that the phrase "having a 10% distillation temperature..." is indefinite.

The distillation characteristics of the lubricant case oil are measured by distillation gas chromatography (ASTM D-2887), as described at paragraph [0064] of the specification. Distillation temperature is measured based on weight. The 10% refers to the weight of the Fischer-Tropsch wax. These parameters are well-known to a person of ordinary skill in the art. Applicants thus submit that claim 4 is definite.

Applicants thus request withdrawal of the rejection.

Rejection Under 35 U.S.C. §102(b)

Claim 1 is rejected under 35 U.S.C. §102(b) as allegedly being anticipated by Aldrich (U.S. Patent No. 6,008,164).

Claim 1 recites a lubricant base oil with an average branch number Nb not more than $(0.2N_c - 3.1)$ but not less than 1.5 and an average carbon number Nc of 29-35. Aldrich does not describe a lubricant base oil with these features.

Aldrich describes branched paraffins having a carbon chain length of about C₂₀ to about C₄₀ (column 2, lines 9-20; column 5, lines 25-35). The average carbon chain length is thus about 30 (i.e., the midpoint between C₂₀ and C₄₀). The Total Attachments described in Table II of Aldrich correspond to the branch number Nb recited in claim 1. The total attachments in Table II range from 3.14 to 4.19.

Aldrich thus describes branched paraffins having an average carbon number Nc of 30, and an average branch number Nb of 3.14 to 4.19.

In contrast, a lubricant oil of claim 1 having an average carbon number Nc of 30, must have an average branch number of less than 2.9 (when $N_c = 30$, $N_b = ((0.2)(30) - 3.1)$, or 2.9). The lubricant base oil described by Aldrich thus does not possess the features of the lubricant base oil of claim 1. Claim 1 is thus not anticipated by Aldrich.

Applicants request withdrawal of the rejection.

Rejection Under 35 U.S.C. §103(a)

Claims 2 and 3

Claims 2 and 3 are rejected under 35 U.S.C. §103(a) as allegedly being obvious over Aldrich in view of Estes (U.S. Patent No. 3,709,817).

Aldrich is cited as above regarding claim 1. Estes is cited as describing the straight chain hydrocarbon starting material recited in claims 2 and 3.

Without acquiescing to the Examiner's assertions regarding Estes, Applicants submit that Estes does not remedy the deficiencies of Aldrich, as discussed above. Estes does not describe a lubricant base oil with an average branch number Nb not more than $(0.2N_c - 3.1)$ and an average carbon number Nc of 29-35. The combination of Aldrich and Estes thus does not describe the features of claim 1. Because claims 2 and 3 depend from and include the features of claim 1, the combination of Aldrich and Estes also fails to describe the features of claim 2. Claims 2 and 3 are thus patentable over Aldrich and Estes.

Applicants request withdrawal of the rejection.

Claims 4-19

Claims 4-19 are rejected under 35 U.S.C. §103(a) as allegedly being obvious over Aldrich in view of Wittenbrink (U.S. Patent No. 6,506,297), and further in view of Estes.

Aldrich is cited as above regarding claim 1, and Aldrich in view of Estes is cited as above regarding claims 2 and 3.

Wittenbrink describes hydrocarbon base oils and a process for producing them. Wittenbrink does not, however, specifically describe the average carbon number Nc or the average branch number Nb of the lubricant base oils produced.

Claims 4-19 recite a method of producing a lubricant base oil wherein a viscosity index is 145-170 and a kinematic viscosity at 40°C is 17-25 mm²/s. Claim 4 also recites a method comprising subjecting starting oil to an isomerization under a condition that a

decreasing ratio of a fraction having a boiling point of not lower than 360°C is not more than 40% by weight.

Wittenbrink, in contrast, describes a process of producing lubricant base oils, but wherein the lubricant base oils produced do not have the viscosity index and kinematic viscosity recited in claims 4-19. Specifically, at Table 3 Wittenbrink describes the properties of various base oils produced by the process described therein. None of the oils described have both a kinematic viscosity at 40°C of not higher than 25 mm²/s and a viscosity index of not lower than 145. For example, the 175 N oil produced at 30% and 50% conversion each have a viscosity index higher than 145, but both also have a kinematic viscosity of higher than 25 mm²/s. The 175 N oil produced at 80% conversion has a kinematic viscosity of less than 25 mm²/s, but also has a viscosity index of lower than 145.

Wittenbrink thus does not describe the method of producing lubricant base oil having the features recited in claims 4-19. There would therefore have been no reason or rationale for a person of ordinary skill in the art to have combined and/or modified the cited references in order to have arrived at the method of claims 4-19. Claims 4-19 are thus not obvious over the cited references for at least the above reasons.

Regarding claim 5, Applicants submit that none of Aldrich, Estes or Wittenbrink describes a method wherein a fraction separated from the oil obtained by the first hydroisomerization, comprising mainly a normal paraffin (fraction α), is subjected to the second hydroisomerization. Claim 5 and claims dependent therefrom are thus patentable for this additional reason.


Applicants request withdrawal of the rejection.

Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-19 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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